REMARKS

The Office Action of September 29, 2004 has been received and its contents carefully considered.

Claims 1, 3, 5 to 11, 13 to 16, 18, 20 and 21 are all the claims pending in the application, prior to the present amendment.

Applicants have amended claim 3 as set forth above to make it clear that the vapor grown carbon fiber has a Co value of 0.680 nm or less. In addition, applicants have canceled claim 6, and have amended claims 8 to 10 and 21 to depend from claim 7 instead of claim 6.

Claims 1, 3, 5 to 11, 13 to 16, 18, 20 and 21 have been rejected under 35 U.S.C. § 103(a) as obvious over the previously cited PCT Publication WO 00/58536 to Nishimura et al, whose English equivalent is U.S. Patent 6,489,026, in view of the newly cited U.S. Patent 6,780,388 to Masuko et al.

Applicants submit that the above documents do not disclose or render obvious the subject of claims 1, 3, 5, 7 to 11, 13 to 16, 18, 20 and 21 and, accordingly, request withdrawal of this rejection.

The present invention as set forth in claim 1 is directed to an electrical insulating vapor grown carbon fiber having a fiber diameter of 0.01 to 0.5 μm, a hollow part in the center of the fiber and a boron concentration of about 1 to about 30% by mass in terms of a boron element, wherein the surface thereof is partially or entirely coated with an electrical insulating material of boron nitride and the amount of boron in a depth of 1 nm from the surface of the vapor grown carbon fiber is about 10% by mass or more, based on the entire mass of the vapor grown fiber

having a depth of 1 nm from the surface, and wherein the electrical insulating vapor grown carbon fiber has a specific resistivity of 10^3 Ω•cm or more when compressed at a bulk density of 0.8 g/cm^3.

Each of the independent claims in the present application, namely, claims 1, 7, 11 and 16 recites an electrically insulating material of boron nitride as a coating.

Nishimura et al disclose the addition of boron or a boron compound to vapor-grown carbon fibers (VGCF). Nishimura et al disclose a number of different boron compounds, among which is boron nitride, but do not contain a specific example of the use of boron nitride, and do not disclose or suggest that a coating of an electrically insulating material of boron nitride is formed. Thus, the disclosure of boron nitride in Nishimura et al does not satisfy the recitations in the present claims of a partial or entire coating of an electrical insulating material of boron nitride.

In particular, in Nishimura et al, VGCF and a boron compound are mixed (not necessarily uniform mixing) and heated at 2,000°C or more in an inert gas atmosphere. As a result, B enters into a graphen sheet of VGCF, whereby the crystallinity of graphite and, in turn, the electrical conductivity and thermal conductivity of VGCF are enhanced. The only inert gas disclosed in Nishimura et al is Ar.

The boron compound used as the boron source in Nishimura et al decomposes into B and others when heated at a high temperature of 2,000°C or more. By the entering of B produced upon decomposition into a graphen sheet of VGCF, the crystallinity of graphite is enhanced. At

this time, any B that does not enter into the graphen sheet of VGCF reacts with VGCF or with carbon that does not constitute VGCF and which is present as an impurity, and forms B_4C.

In the case of an Ar inert gas atmosphere as in Nishimura et al, B forms a compound only with carbon, and O or N in the boron compound, such as B_2O_3 and BN, is diluted with the Ar gas and does not remain as VGCF or as a boron compound. Thus, Nishimura et al do not disclose or suggest a coating of an electrical insulating material of boron nitride.

In contrast to Nishimura et al, the present invention provides a coating of an electrical insulating material of boron nitride. Such a coating is achieved, for example, as the result of the use of an atmosphere that is not disclosed in Nishimura et al. For example, when N_2 is used as the atmosphere gas, since N_2 has reactivity at high temperature, B that does not enter into the graphen sheet of VGCF reacts with N_2, and forms a BN film on the VGCF surface, whereby an insulating VGCF is obtained. Also at this time, the crystallinity of graphite is enhanced by virtue of entering of B into the graphen sheet of VGCF and therefore, the Co value of VGCF itself becomes small. As a result, the thermal conductivity of VGCF is enhanced. However, since an insulating BN layer is formed on the VGCF surface, an insulating VGCF results.

Other than N_2, a compound containing nitrogen or capable of generating nitrogen can also form BN layer on the surface and, for example, ammonia or urea can be used. See page 8 of the present specification.

The Examiner recognizes that Nishimura et al do not disclose the use of nitrogen as an inert gas, but takes the position that inert gases of nitrogen and argon are obvious variants over one another. As can be seen from the above discussion, however, nitrogen and argon are not

equivalent to each other, and function in a different manner from each other. Nishimura et al nowhere disclose or suggest forming a boron nitride electrical insulating material on a vapor grown fiber, and there is no teaching or suggestion in Nishimura et al to employ nitrogen or any other nitrogen compound to form a boron nitride electrical insulating material on a vapor grown carbon fiber.

In view of the above, applicants submit that Nishimura et al do not disclose or suggest the subject matter of the present claims.

Turning now to the Masuko et al that the Examiner has cited, this patent issued from an application owned by Showa Denko. K.K., which application was co-pending with the present application which is also owned by Showa Denko K.K.

Applicants submit herewith the following statement to establish common ownership of the present invention and the subject matter disclosed in the Masuko et al patent, at the time the present invention was made, in order to disqualify the Masuko et al patent as prior art under 35 U.S.C. § 103(a).

> The above-identified Application No. 10/067,266 and U.S. Patent 6,780,388 to Masuko et al were, at the time the invention of Application No. 10/067,266 was made, owned by Showa Denko K.K.

In view of the above, applicants submit that the Masuko et al patent cannot be used as a reference under 35 U.S.C. § 103(a) against claims 1, 3, 5, 7 to 11, 13 to 16, 18, 20 and 21.

In view of the above, applicants request withdrawal of this rejection.

In view of the above, applicants request withdrawal of this rejection.

Claims 6 and 8 to 10 have been rejected under 35 U.S.C. § 102(e) as anticipated by the newly cited Masako et al '388 patent.

The Examiner has not rejected claim 7 based on Masuko et al. Applicants have canceled claim 6, and have amend claims 8 to 10 and 21 to depend from claim 7 instead of claim 6.

Thus, the anticipation rejection has been overcome. Further, applicants' statement of common ownership disqualifies Masuko et al as prior art under 35 U.S.C. § 103(a).

In view of the above, applicants request withdrawal of this rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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23373
CUSTOMER NUMBER

Date: March 29, 2005